

REMARKS

Applicants thank the Examiner for the thorough consideration given the present application. Claims 1 and 3-7 are currently being prosecuted. The Examiner is respectfully requested to reconsider his rejections in view of the amendments and remarks as set forth below.

Rejection Under 35 U.S.C. § 112

Claim 7 stands rejected under 35 U.S.C. § 112 second paragraph as being indefinite. The Examiner felt that claim 7 was unclear because of what is meant to be freely changed. By way of the present amendment, Applicants have canceled this language and replaced it with a more definitive statement of the change and the result being thereby. Applicants have also modified the specification at a corresponding location to include similar language in the specification. Accordingly, this rejection is believed to be overcome.

Rejection Under 35 U.S.C. § 102

Claims 1 and 7 stand rejected under 35 U.S.C. § 102 as being anticipated by Kienzle et al. (US Patent 6,891,513). This rejection is respectfully traversed.

The Examiner states that the Kienzle et al. reference shows an antenna device with a substrate 3, a microstrip patch 4, a conductive member 2 with upper and lower openings, a ground plate 7 and where the diameter of the upper opening is larger than the diameter of the lower opening.

By way of the present amendment, Applicants have added further limitations to claim 1. These include the limitations of claim 2 as well as additional limitations. The final paragraph of claim 1 describes the height of the conductive member and the diameter of the substrate. Since the Examiner has not rejected claim 2 in this rejection, Applicants submit that claim 1 now overcomes the anticipation rejection.

Rejection Under 35 U.S.C. § 103

Claims 2-4 stand rejected under 35 U.S.C. § 103 over Kienzle et al. This rejection is respectfully traversed.

Claim 2 has been canceled rendering this part of the rejection moot. However, this rejection will be considered in regard to claim 1 which now includes the limitations of claim 2. The Examiner indicates that while the reference does not show the various sizes described in these claims, that it would be obvious to one skilled in the art to choose the various sizes of the height and diameter since this would not be a difference of patentable merit. Applicants disagree that the specific sizes mentioned would be obvious.

It should be remembered that it is possible to obtain a higher gain and/or a narrower beam width if the height of the conductive member is from $1/3$ to $1/2$ wavelength. Likewise, similar results can be obtained by adjusting the diameter of the substrate.

This differs from the reference where the antenna system is used to measure the filling level of the product in a receptacle using microwave signals. This device includes an antenna horn having an inner horn flaring zone and a planar structure present in the flaring zone which couples microwave signals into the antenna horn to determine the filling level of the product. In this antenna, separate patches are used to electrically couple to each other. The gain is increased by using several patches. This antenna system is filled with a dielectric material to protect the patches from chemical action. This allows for further reducing the size of the antenna system since the radiation of surface of the filling material can be in the form of an optical lens so that the wave propagation angle is reduced and the wave signal is less scattered than as usual with patch antennas. Thus, it is possible to reduce the size of this antenna system. This is different from the present invention where the antenna device has a higher gain and/or a narrower beam width by adjusting the diameter of the substrate, the height of the cylindrical conductive member and the diameter conductive member.

The Kienzle et al. reference has no description about the diameter of the substrate and the height of the conductive member. In particular, it does not show any diameter in the range of $3/4$ to $5/4$ of the wavelength and the height in the range of $1/3$ to $1/2$ of the wavelength. The present invention obtains a higher gain and/or a narrower beam width by using one substantially circular microstrip patch without providing any filling acting as a lens. Therefore, it is believed that the present invention is not obvious over this reference which must use several rectangular patches and a filling which acts as a lens.

It is noted that the Examiner stated that these various parameters of size are not of patentable merit since the sizes can be selected based on a particular application or environment. Applicants wish to point out, however, that the sizes have a strong relationship with the properties of the antenna device and the antenna device can provide excellent properties such as higher gain and narrower beam by adjusting the height, the diameter of the substrate and the diameter of the upper opening portion. Thus, the present invention teaches against the Kienzle reference by having only a single circular patch rather than several rectangular patches and by adjusting the height and the diameters rather than having a smaller size of an antenna as taught by the reference. In view of this, Applicants submit that the present claims are not obvious over Kienzle et al.

In particular, claim 1 specifically defines the height as being from $1/3$ to $1/2$ of a wavelength and a diameter of the substrate of $3/4$ to $5/4$ of a wavelength. Claim 3 more specifically defines the height as being $1/3$ of a wavelength and the diameter of the upper opening as being from $13/12$ to $11/6$ of a wavelength. Claim 4 likewise describes the height as being about $1/3$ of a wavelength, the diameter of the substrate as being about a wavelength and the diameter of the upper opening of about $3/2$ of a wavelength. These various parameters are not described in the Kienzle et al. reference and accordingly, each of claims 1, 3 and 4 is not obvious thereover.

Claims 5-7 depend from these allowable claims and as such are also considered to be allowable. In addition, these claims include additional limitations which make them additionally allowable. Thus, claim 5 describes a honeycomb material, claim 6 describes the parasitic microstrip patch, which is not seen in the references and claim 7 describes the changing of the height and diameter to obtain a gain and beam width. Accordingly, Applicants submit that these claims are allowable.

Claim 5 stands rejected under 35 U.S.C. § 103 as being obvious over Kienzle et al. in view of Doyle (US Patent 4,660,048). Claim 6 stands rejected under 35 U.S.C. § 103 as being obvious over Kienzle et al. in view of Kuramoto et al. (US Patent 5,977,710). These rejections are respectfully traversed.

The Examiner cites the Doyle reference to show honeycomb material. The Examiner cites Kuramoto to show a parasitic microstrip patch in front of the radiation surface. Applicants submit that these claims remain allowable because of their dependency from allowable claim 1. Furthermore, in regard to Doyle et al., a plurality of stacked antenna elements is shown rather than an antenna horn as presently described in Kienzle et al. Since the horn of Kienzle et al. is different from the primary reference, Applicants submit that the present claimed invention is not obvious over this combination.

Concerning the Kuramoto et al. reference, the reference does not show an antenna horn like the antenna system of Kienzle et al. Accordingly, Applicants submit that the present claimed invention is not obvious over the combination of these two references either.

CONCLUSION

In view of the above remarks, it is believed that the claims clearly distinguish over the patents relied on by the Examiner, either alone or in combination. In view of this, reconsideration of the rejections and allowance of all the claims are respectfully requested.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert F. Gnuse, Reg. No. 27,295 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

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